FAA general aviation NEWS

JAN-FEB 1981

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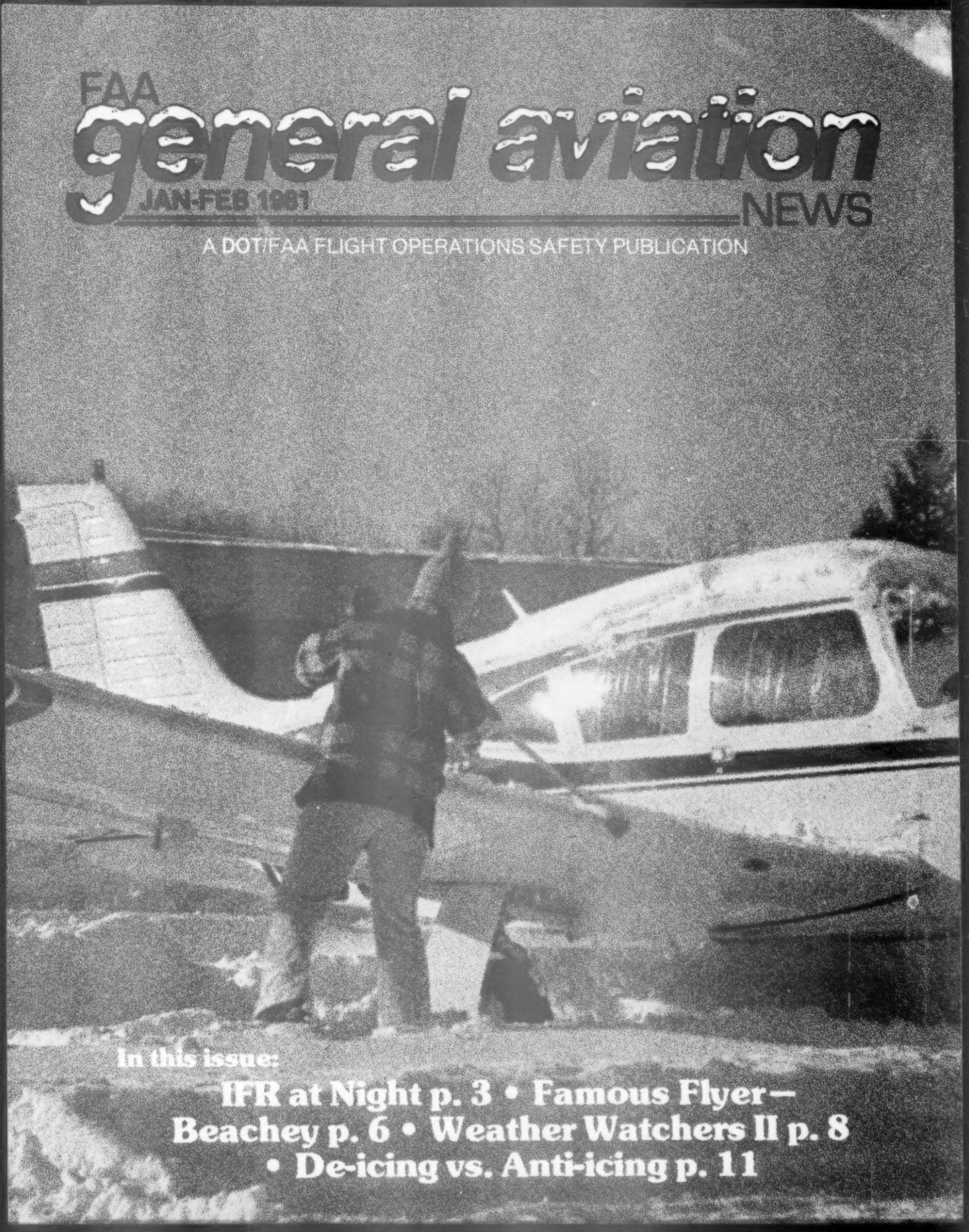

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FAA GENERAL AVIATION NEWS

DEPARTMENT OF TRANSPORTATION/ FEDERAL AVIATION ADMINISTRATION

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Drew Lewis, *Secretary of Transportation*

Kenneth S. Hunt, *Director, Flight Operations*

Bernard A. Geier, *Chief, General Aviation and Commerical Division*

David Gelfan, *Editor*

P.A. Duncan, *Assoc. Editor*, Louise Oertly, *Ass't. Editor*

Michael Friend, *Research Ass't.*

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BRIEFS

STOPPING THE STARTER. Abnormal radio static, dimming of cockpit lights, or excessive ammeter/loadmeter readings after you crank up your engines could be signs of starter motor trouble, possibly in the relay. If the relay fails, in the closed position, the starter motor could continue to run without being noticeably audible (unless you were listening for it) after the engines have started. The result could be burnt-out components and possibly electrical failure in flight. Be alert when you start up, and have a mechanic check the starter for the cause of suspicious behavior.

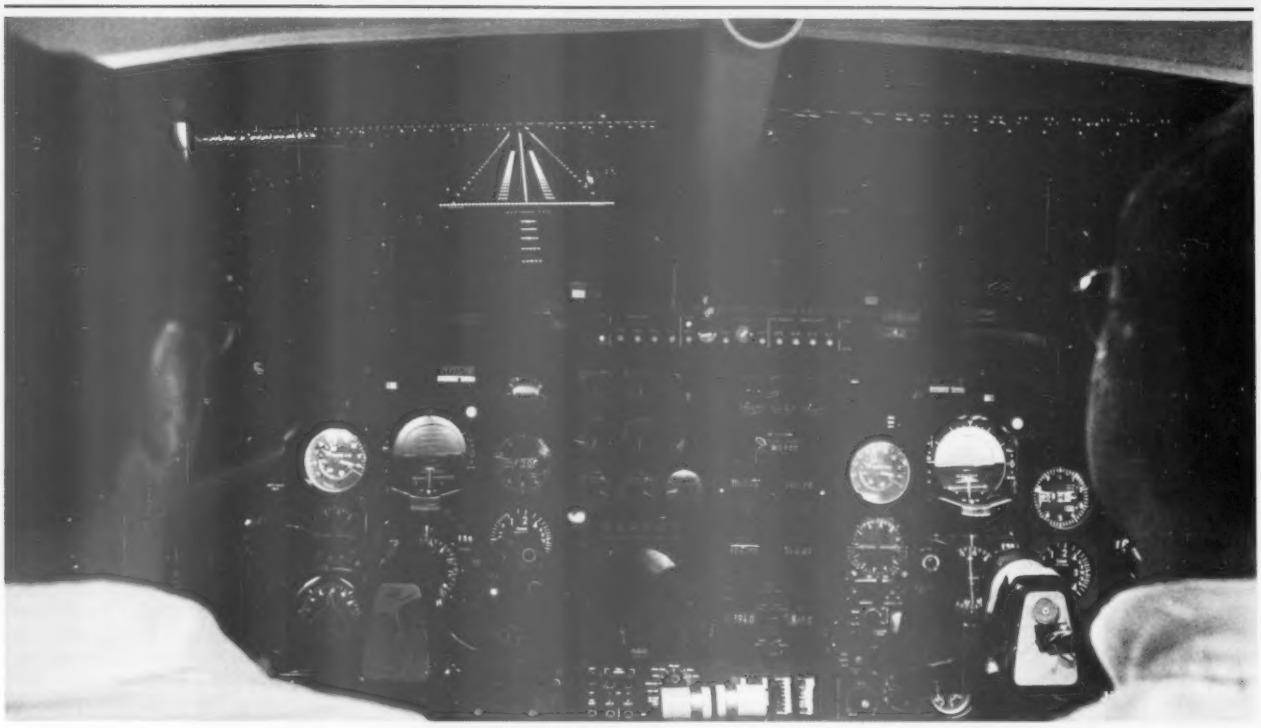
DON'T LEAVE WITHOUT ONE. Winter is the critical season for locating downed pilots as swiftly as possible, to ensure their survival. Aircraft which have crashed in the winter without the required emergency locator transmitter on board have been lost for months. A temporary moratorium concerning installation of ELTs, to allow manufacturers time to produce acceptable batteries, ended on October 15, 1980.

ILLUMINATING MIKE PROBLEMS. Increasing instances of unintentional frequency blockage could be reduced by installing one of the available warning lights now on the market. The lights will signal transmitter malfunction as well as inadvertent keying. Installation is simple but must be done by an authorized mechanic.

DATA DEARTH. Accidents to used aircraft, after changes in ownership, have occurred when operational limitations have been exceeded, apparently because the FAA approved flight manual was not accessible to the new owner, or required limitations placards were missing. Owner's manuals issued prior to 1974 may not contain all operating limitations. Consult FAA district offices for complete operating data and specifications.

OUTDATED DIRECTORIES. Costs are forcing some state governments to forego annual printing of state aviation directories, which list airports in the state and give pertinent information about them. Current information, when needed, can be obtained from FAA Regional Airport Facility Directory, issued every eight weeks and on sale from most FBOs or from the Department of Commerce. Send a check for $2.50 to NOAA, Rockville, MD 20852.

IFR · AT · NIGHT



Why Some Planes Go BUMP in the Night

If, as we have seen (Nov./Dec. issue), VFR pilots who fly at night experience a higher than normal fatal accident rate, what can we say about night flying accidents involving *instrument-rated* pilots?

Once again, the proportion of fatal accidents is high—about one out of three, as compared with about one fatal per twelve accidents in overall flying. The fatal rate is far higher when the accident takes place at night *in IFR conditions*.

In 1978, for example, there were 73 accidents at night in general aviation involving an instrument-rated pilot in IFR weather; 51 of these were fatal, according to information provided by the National Transportation Safety Board.

Obviously the instrument rating in itself will not guarantee survival if the pilot elects to land at airports where the weather is below minimums; or fails to utilize all available air traffic services; or disregards such hazards as snow, rain, icing, and turbulence; or is not prepared to cope with inflight emergencies.

Flying in actual IFR conditions at night imposes a demand on pilot performance that can be greater than many pilots anticipate. To be sure, the air carriers fly at night in all kinds of weather, and there is no indication this has any impact on their safety record. But the air carriers do most of their flying *above* the weather, and land only at airports where a qualified weather observer is on station. Much of the general aviation IFR traffic is flown in or below the clouds, and on approaches where no official weather observer is required at the destination airport (provided an area altimeter setting may be obtained). There are other important differences between the two categories of flight:

- Air carrier flights are conducted with two or more pilots. Most night IFR accidents in general aviation occur when there is only one pilot on board. An extra pair of eyes and hands can be a great advantage in difficult weather in the dark.
- Air carrier flight instruments are generally more numerous, more redundant and require more frequent calibration checks. Many general aviation aircraft fly IFR without weather radar, for example, and with only a basic set of instruments.
- Air carrier aircraft generally have a greater redundancy or fail-safe principle built into their accessory systems (such as electrical components). For example, most single engine aircraft have no generator redundancy. Complete electrical failure at night can be a prelude to disaster.
- Air carrier pilots are professionals whose performance standards in all kinds of conditions are checked frequently. Most general aviation pilots are nonprofessionals, and many have never experienced actual IFR conditions at night.
- The smaller size and lower flight altitude of general aviation aircraft make them more sensitive to buffeting from turbulence and less able to maintain precise course headings and assigned altitudes in rough weather.

By far the greatest number of IFR-at-night accidents take place during the landing phase of flight. A study of the accident data shows that in many cases the pilots were attempting to land at an uncontrolled airport with marginal visibility or ceiling, often after a long day of flying which may have produced eye fatigue.

The light level at an airport at night under a heavy cloud cover, or during a rain shower, is considerably less than it is in the poorest sort of weather in daylight. However, unless noted otherwise on the approach charts, visibility minimums are the same for night or day operations. This means that on a night approach, visible cues will be much fewer and of a different order (they may consist only of lights, lacking multidimensional aspects) until the pilot reaches the runway threshold. Incidentally, it is important to study beforehand the notations in small print on the approach plates regarding any increase in landing minimums that may be required under certain conditions, such as the absence of local altimeter setting data. In some areas the increase in required visibility and/or ceiling may be as much as 50 percent.

Familiarity with runway lighting systems is essential for night flying. It is important to remember, for example, that the flashing lights of a runway alignment indicator, or "lead-in" system, do not terminate at the runway threshold, but are always followed by a final segment, at least 1,000 feet long, consisting of short transverse rows of white lights. The flashing lights are usually set upon poles of graduated height above the ground, with an angle of descent that parallels the glide path. Going off instruments prematurely and attempting to estimate height above ground by visual reference to approach lights during a night IFR approach, when the ground itself is not visible, is a practice that has led to fatal errors.

On the evening of January 7, 1980, a twin Cessna 310 was cleared for a straight-in ILS approach to Runway 4 at Tuscaloosa (ALA) Municipal Airport. The pilot contacted the tower on reaching the outer marker, and was cleared for landing. Local weather was estimated 400 feet overcast, visibility three miles, light rain and fog, wind 070° at four knots. The decision height was 368′ MSL (200′ above the ground), visibility one half mile.

The local controller could see the landing lights of the light twin, and advised the pilot that runway lights were at full intensity, but would be turned down if desired. The pilot acknowledged, but made no request regarding the lights. The aircraft disappeared a short time later, and the pilot did not respond to transmissions from the tower.

The pilot of the 310 was a 55-year old management consultant with approximately 5,000 hours of flight time, holding a commercial certificate and instrument rating. He used his aircraft frequently for business and on this day had flown to Huntsville for a breakfast meeting, to Montgomery for talks over lunch, and to Birmingham for an afternoon planning session. He was accompanied by his son, a college student home on vacation. The son was seated in back, reading, during the approach to land at Tuscaloosa.

The airport was visible to the pilot through a layer of thin clouds during the early part of the approach and the autopilot was uncoupled at an altitude of "from 300 to 400 feet MSL;" according to the pilot's subsequent statement. At this point a light rain was falling but the pilot remembered that he could see the runway lights clearly, and even the city lights in the background. The final approach course lay over a swampy, partially wooded area.

As he took over manual control, with the airspeed at 100 mph, he felt the aircraft settle. He was not watching the glideslope indicator after uncoupling, but concentrated on the runway environment. He glanced behind to see if his son's seatbelt was fastened, and was about to initiate his flare when abruptly a tree burst through his windshield, and the aircraft slewed violently around before plunging into the swamp, approximately 60 feet short of the middle marker and 3,400 feet from the runway threshold. There was no fire and the pilot was able to extricate himself and his passenger from the airplane before the rescue team arrived. The son died from massive head injuries.

In later discussions with investigators, the pilot said that he could in no way account for the premature landing. The aircraft performed well in all respects and he himself, he stated, did not feel fatigued, despite his admittedly long day of flying and working. He stated that he was a teetotaler and never indulged in any alcoholic drinks or smoked (this was confirmed by associates.) He recalled that he had been above the glide path when he came over the outer marker and had steepened his descent angle and reduced power to intercept the glidepath. He did not recall whether he had added power after intercepting the glidepath and uncoupling. He was aware of the field elevation (169 feet) and knew that at 300′ to 400′ MSL he could have been less than 150′ above the ground, but he did not believe he had allowed the aircraft to settle "more than 100 feet at most." (Note: Initial impact with the trees took place at approximately 50′ above the ground.) Prior to impact he was controlling the pitch angle by reference to the horizon formed by the city lights reflected against the sky. He remembered hearing the audible signal for the middle marker, but was not certain when this occurred. He could not account for the error which led to the fatal crash. He recalled that the flashing lead-in lights "were dancing in the raindrops on my windshield."

Some pilots find it difficult to remember that an ATC clearance to land is primarily an assurance of traffic separation. Unconsciously they rely on controllers in the tower to call their attention to errors in their approach, which is not always possible. Sometimes the warning does not reach the pilot in time.

Rain is not the only liquid source of visual distortions at night. Anti-icing alcohol sprayed on the windshield can temporarily render the glass opaque and lead to trouble if this occurs at a critical phase of flight—as it did when the pilot of a Cessna 402 attempted to land at Rolla National Airport, Vichy, MO on a snowy night in February 1978.

The flight, which originated at Cape Giradeau at 10:15 pm, was one leg of a regular nightly mail run in southeastern Missouri, and the pilot, 32, was properly qualified for the light twin and instrument-rated, and obviously familiar with the airport and the aircraft. On this particular night there was a thick layer of snow on the ground, and a weather observation taken at Vichy five minutes after the accident indicated a ceiling 700′ indefinite, sky obscured, visibility two miles, light snow, fog, wind 330° at five knots, altimeter 29.85.

The instrument runway at Vichy, 22–04, is 5,500′ long and 150′ wide. Because of frequent heavy winter snowfalls since January it had been the practice of the airport manager to maintain a plowed clear strip 40′ wide in the center of the runway. On the night of February 13 the cleared strip was reported as icy, with considerable snow depth on either side and frozen snowbanks alongside the runway. The airport was officially open, but the one fixed base operator, Skyway Aviation, had cancelled several flights scheduled for that evening due to runway conditions, and the operator of the mail run was advised by ground service personnel not to bring the mail plane in because of poor braking conditions on the runway.

At 11:13 pm the Cessna 402 contacted the Vichy FSS and advised that he had been cleared for the instrument approach to Rolla National. He was given the normal information for weather and wind—which was reported as favoring runway 04. The pilot elected to use runway 22 and at 11:23 reported inbound over the VOR. He stated that the prevailing visibility was good but that he was encountering freezing drizzle on the approach and having trouble keeping his windshield clean. He was using an alcohol anti-icing spray which obstructed his vision for "about 15 to 20 seconds" each time it was turned on.

He said that the blurred condition of his windshield made it impossible for him to see the center area of the runway, and his only visual references to the ground during the landing were the runway edge lights at either side. Consequently he landed in an unplowed area of the runway where the snow was 9 to 16 inches deep, and struck a snowbank before coming to a stop. The aircraft was substantially damaged, but the pilot was not injured.

In a statement attached to the accident report, the Airport Liaison Officer said his examination of the wreckage disclosed that the plane had impacted in a nose-down, rightwing low attitude, indicating it had stalled out over the runway. He noted that the impact had torn off the nose wheel and left landing gear. He suggested that the aircraft had probably picked up so much structural icing on the wings that it could no longer remain airborne. The pilot indicated that he might not have attempted the landing if he had known that the entire width of the runway was not plowed. However, given the pilot's inability to see directly in front of him for repeated periods during the approach to land, plus the lack of visual

Night IFR approach to Tuscaloosa Airport ended in a wooded swamp far short of runway. Rain, darkness and flashing lights led to disorientation.

cues other than the edge lights, it would seem that landing would have been hazardous with this type of aircraft in these conditions regardless of the width of cleared runway available. You have to be a Lindbergh to navigate with side vision only in darkness and precipitation, and even the Lone Eagle admitted he had been lucky.

Loss of electrical power, always a potentially serious problem for IFR aircraft, takes on even larger proportions when operating IFR in the dark. Disorientation is a potential threat, even when professional crews and transport airplanes are involved. The following example occurred to a four-engine Lockheed *Electra* which had three generators, including one "spinning reserve" generator. Nevertheless, power decay and malfunction set in motion events which culminated in loss of control of the airplane, inflight structural disintegration, and loss of life to all on board.

The *Electra*, operated by Transamerica Airlines Logair, departed from Hill Air Force Base at Ogden, UT at 4:56 am on November 18, 1979, with three crewmembers and 27,552 lbs. of cargo. The captain had filed an IFR flight plan for Nellis Air Force Base, NV. At this time, nearby Salt Lake International Airport was reporting: clouds 2,000′ scattered, measured 3,200 broken, 7,500 overcast, visibility 10 miles in light rain showers.

Almost immediately after takeoff, while the *Electra* was climbing out over Salt Lake City, the crew experienced difficulty with radar displays on their weather radar and with the captain's VOR indications and flight director. This was followed by a momentary loss of all electrical power, apparently due to an electrical system malfunction which occurred as the aircraft was climbing from 12,000′ to 13,000′.

Seconds later, partial power was restored by means of the reserve generator, but the available power was insufficient to maintain the first officer's flight instruments. Additionally, the integral lights for both pilots' instrument panels went out. The crew contacted Salt Lake departure control and requested no-gyro vectors to visual flight conditions and clearance for an immediate descent to a lower altitude.

The crippled aircraft was immediately vectored toward Salt Lake International. However, during the descent the *Electra* achieved an extremely high rate of speed and disintegrated in flight.

From evidence found in the wreckage and taken from the cockpit recording tapes, investigators for the National Transportation Safety Board concluded that the captain's flight director, gyro compass, and turn-and-bank indicator were all fully operative following the interruption of power, and that the instruments could have been read by means of the flashlight which the first officer had located and was using. (Power was also available for panel lighting from an emergency set of lights.)

Investigators believe that the pilots were uncertain which, if any, of the instruments could be trusted at this point, and they were concerned with the need to maintain a safe minimum altitude, given the presence of mountains over 10,000′ to the north, east, and south of Salt Lake City. Apparently the captain, who was flying the airplane in clouds, became spatially disoriented and allowed the aircraft to enter a steep power dive which exceeded redline.

The three accidents related above are not intended to suggest that night flying in IFR conditions should always be avoided in the name of safety. They are meant, rather, to caution the general aviation pilot that this kind of flying *could place a much higher demand on their piloting ability than anything they are used to or could ever imagine.* Aircraft *have* been landed at night in IFR conditions with zero electrical power, but this takes some very remarkable flying. Similarly, aircraft are frequently landed safely at night despite heavy rain showers or snow and sleet, but the pilots who fly them are in the very top bracket of their profession. They are flightchecked often and they do not fly alone.

If you fit into this category, okay. If not, perhaps you had better not flaunt your instrument ticket at Mother Nature. She doesn't like to be fooled around with. ■

Data for the accidents described in this article was drawn from reports of the National Transportation Safety Board. Certain details have been altered to protect privacy.

LINCOLN BEACHEY:

On a late September day in 1914 President Woodrow Wilson was sitting at his desk dealing with the mounds of paper work piled in front of him, when he noticed the faint droning sound of bees outside was becoming progressively louder. He looked out his window and to his horror realized that the sound he heard was that of an airplane diving directly toward him. Frozen in his chair, he saw the plane come closer and closer until at seemingly the last possible moment it pulled up and over the White House roof, letting the President read in bold letters the name painted on the bottom wing— B E A C H E Y.

The signature was really unnecessary. The idea of having an airplane fly over the capital in order to impress the Government with the need for aircraft in military defense apparently originated with the Secretary of War, but only one man in the country would have had the nerve to buzz the White House in that manner. "I wanted to get his attention," Lincoln Beachey told the troops of soldiers and reporters who surrounded him when he landed on the nearby Mall, and no doubt he did. No one has ever created as much excitement among spectators as this strange, solitary fireball of a pilot. He alienated almost everyone, but the whole world recognized him as a genius who used the sky as a stage where he performed aerobatics of unbelievable artistry.

Lincoln Beachey was born on March 3, 1887, to William and Amy Beachey in San Francisco. As a child, he was short, fat and moody, making him an easy target for his classmates. The teasing and tormenting he endured drove him into solitude, and he learned to live without friends, spending his time in a small room where he could putter around with mechanical devices. In this environment he was safe, and soon he became expert in repairing and building anything mechanical. His mother encouraged this by supplying him with money for gadgets and tools.

In 1902 Beachey quit school, which he detested, and went to work in a shop putting small motors on bicycles. The only practical means of local transportation at that time was horse and buggy, as the streets of San Francisco were too steep for cars—unless you wanted to back up every hill. On his motorbike Beachey delighted in whizzing his way through traffic, scattering horses and buggies in his wake. The only person to out-distance him was a balloonist, whose flight Beachey attempted unsuccessfully to pursue. He became a dedicated aeronaut and airship designer overnight. Men were installing motors in buggies, so why not in a balloon?

His first airship, the *Rubber Cow*, completed in 1904, had a cigar-shaped gas bag with a long catwalk running fore and aft. Since the ship had no elevator, ascent and descent were controlled by the pilot's movements—running foreward to descend, aft to climb. In the stern end of the catwalk was a basket containing a motor and a small wooden propeller. Beyond that was a sweeplike rudder controlled by ropes and pulleys.

After one test flight, the 15 year old aeronaut booked himself at the Oakland Air Festival and flew his *Cow* successfully just over the heads of the crowd. Disappointed by the lack of excitement, onlookers swarmed over Beachey when he landed, and wrecked his airship. *They wanted thrills*, he realized, and he was determined to provide just that.

Within five years he became the outstanding airship stunt and racing pilot of the nation, astounding audiences everywhere with his ability to dive and climb vertically. Still the moody youth realized it was all pretty tame compared with what others like the Wrights and Curtiss were beginning to do with airplanes, so in 1909 he joined the Curtiss Aircraft as a pilot trainee.

Glenn Curtiss himself was skeptical about the young loner, who disdained advice and preferred to work out everything on his own. Curtiss would instinctively close his eyes when Beachey came in for a landing, which tended to be short and hard. After three crack-ups Beachey got the hang of it, and after that no one could keep up with him. Aloft he was poetry in motion, and quickly became the star of the Curtiss Exhibition Team.

The Team's purpose was to ignite interest in aviation and in Curtiss aircraft by appearing at county and state fairs and in aerial stunt competitions.

Competitive flying with circus-type stunts, high speed power dives and pull-ups seconds before crashing, were beginning to take their toll as pilots tried to out-do each other, inventing wilder thrills for the crowds, who were getting larger and paying higher prices. Crack-ups were frequent and often fatal. In this dangerous sport Lincoln Beachey was a master.

Half-hidden by spray, Beachey dived Curtiss Pusher over Niagara Falls and under suspension bridge.

REMBRANDT OF THE SKY

As an example, on June 27, 1911, Beachey startled the world by "shooting" the rapids over Niagara Falls. With excellent publicity and a turnout of thousands watching from the bridge and shoreline, he shot over the American Falls and down into the gorge and its mists, dipping his aircraft's nose a few feet above the whirlpool rapids and buzzing under the suspension bridge. So close to the water had his Curtiss Pusher come that it was soaked by the spray.

Although Beachey often said he hated the crowds, he always played to them. "They want my blood, and they're going to pay for it." He was given top billing at all events and meets he entered, earning as much as 50% of the gate receipts, or $5,000 per flight.

The money was only a symbol of the recognition he demanded. Apparently he cached most of his growing fortune in safety deposit boxes across the country, and as he kept poor records probably much of it was never recovered.

Exhibition night flying was introduced to the public in February 1911 at Tampa, Fla., when Beachey circled the town with an acetylene headlight on each wingtip—and no flight instruments. He had tremendous confidence in himself and was without any trace of fear. He also knew his planes and their limitations and strong points. He enjoyed thinking up new stunts, the more daring and difficult the better. He posted a standing bet against any pilot who would fly along side him at 4000 feet, kill the engine and dive to earth. ". . . the one who gets closest to the grass before he pulls up collects the money." There were no takers.

In 1911 at a show in Chicago Beachey announced to the crowd he would seek a new altitude record by climbing up until no gas remained, then drop to earth. After achieving a record 11,642 feet, he plunged down to a beautiful deadstick landing.

At times Beachey was not above pulling a trick on the crowd. One of his favorites was the introduction of "Madame Helene," a fumbling female pilot. She knew hardly anything about flying but was willing to give it a try. She began with a wobbling take off, and then thrilled the crowd by nearly crashing into everything in sight. They thought it was a miracle that this frail female had not killed herself yet, what with her trying to control her billowing skirts and the plane at the same time. The crowd suddenly discovered that they had been tricked when she came down for a graceful landing and her wig fell off, letting everyone see that Madame Helene's real name was Lincoln Beachey.

On another occasion, when Beachey was demonstrating a Curtiss aircraft for the U.S. Army, in competition with a Wright aircraft pilot, the latter left the airfield in a rage after complaining that Beachey had set his wheels down on the Wright's upper wing in flight. Beachey, equally outraged, insisted that he had come no closer than 12 inches from the wing. He was barred from flying at any military base, but the news, which made headlines everywhere, only served to make him a bigger attraction at airshows. He returned the favor by making such low passes over the stands that spectators had to flatten themselves on the planks to avoid his wheels. ". . . let 'em grovel in the dirt," he exulted.

Originally Beachey's spectacular flights earned him the admiration of other pilots, but later on they began to resent his contempt for danger. By 1912, 22 aviators, all men Beachey knew and had flown with, had lost their lives attempting to copy his feats. He himself was not immune to what he called "heavy landings" and sometimes after these he would have to be lifted out of the plane, but he was still flying. Beachey had an insatiable curiosity as to why accidents happened and would deliberately go into a maneuver that had killed another pilot, in order to see how that death could have been avoided. Sometimes he would try to pass the knowledge on to others in hopes of their avoiding a similar fate, but the death toll continued.

Slowly an element of fear crept into the ranks of his fellow stunt pilots, who no longer tried to keep up with him. "Doing a Beachey" was more and more being left up to the originator.

The deaths of fellow pilots bore heavily on his mind until finally on May 12, 1913, as guest of honor at Los Angeles Olympic Club, he discarded his speech and announced simply in a slow measured statement: "I am through with flying!" The audience was stunned. It was not the flying, he said privately that got to him, but the blame he received when others tried to do his stunts and got themselves killed because they lacked the skill.

Rich beyond his dreams at age 26, he still needed crowds. He embarded on a $3,500-a-week vaudeville junket in which he explained the art of flying, vividly describing his narrow escapes while a fake propeller roared behind him. He kept up this pathetic routine until September of 1913, when the news broke that the first loop-the-loop in history had been made in Europe by the Russian Nesterov and the Frenchman Pegoud. That was all Beachey needed. No one was ever going to out-stunt him.

He left that same day for the Curtiss plant in Hammondsport in New York, where he asked his ex-boss to design a plane especially made for looping. (Curtiss previously had talked to Beachey out of looping his plane by explaining how the maneuver would overstress the wing and stall the engine.) By mid-October workers wheeled out a sturdy, short-winged beauty, supposedly fully aerobatic.

On its maiden hop, Beachey found many flaws with its controls as well as its structure. However, there were many people in the crowd watching him and his return to flying that day and he did not want to disappoint anyone. He attempted, but did not complete two loops, and then headed back. Approaching to land he was unable to gain enough altitude to clear a hangar on which two young couples were sitting. Desperately he tried every trick he knew to avoid it, but the controls were jammed and he crashed. The two young men and Beachey escaped with minor injuries, but one of the girls was killed and the other seriously injuried.

The national press attacked Beachey, calling him a maniacal, reckless pilot, considering only himself. However, an inquest exonerated him and three weeks later he was again set to loop. A revised version of the new plane was ready, a more ruggedly built Curtiss biplane with an 8-cylinder V-type air cooled engine but the same pusher propeller. He tinkered with the engine, inspected the guy wires and checked every nut and bolt he could get his hands on. Finally on November 25, 1913, taking the plane up to 2,500 feet he rolled it over upside down and completed the first loop on this continent.

By the end of 1914 it is estimated he had looped, 1,500 times in 126 cities before more than 17 million spectators. He was hailed as the greatest stunt flyer of all time, ". . . the man who had made flying an art form and the airplane an artist's brush." He was so popular that he could do no wrong—even when he buzzed the White House in September of 1914 to demonstrate the need for planes in warfare.

In 1915 Beachey finally designed and saw built the plane of his dreams. The *Lincoln Beach Special* was an enclosed fuselage monoplane incorporating some of the advanced features of the German *Taube*, and powered by the famous French *Gnome* 80 hp engine. It was built in a San Francisco barn by Warren Eaton of the California Aero Club. Beachey was as enthusastic about it as a child with a new toy and could hardly contain himself waiting to try it out. On March 14, 11 days after his 28th birthday, it was ready to go. Fifty thousand people saw him take off from the San Francisco Polo Grounds at the Panama Pacific Exposition (celebrating the opening of the Panama Canal). They watched him climb to 3,500 feet and then start his familiar yet ever frightening power dive. In the past Beachey had always said he could sense instinctively just how far he could go in any maneuver. Perhaps the enclosure he now sat in cut off some of that essential instuitive knowledge, allowing him to build up too much airspeed. In any case, trying to pull out at 500 feet, he overstressed the wings and snapped them off. He crashed into San Francisco Bay and was drowned. He had always believed he would die with his boots on, finally satisfying the crowds' lust for his blood.

But not before he had convinced the public that the airplane was no meaningless toy but a vehicle that could be placed under complete human control and made to gyrate gracefully through the sky as beautifully as any bird.

The legendary "Flying Fool" was an artist ahead of his time. ■

Weather Watchers II

What you see is what is there

With all of the weather information available to pilots, enroute as well as preflight briefings, why does weather as a factor continue to dominate fatal accident statistics? According to figures provided by the National Transportation Safety Board, in the latest 12-month period there were 761 fatal general aviation accidents, 310 of these accidents or two out of every five were weather-related.

Some veteran pilots, whose flying experiences antedate the era of satellite weather scanning and computerized forecasting, suggest that today's pilots are getting more information about weather but understanding it less.

An example of what can happen when a weather-conscious pilot does everything else right but overlooks one critical factor took place during a flight in central Georgia last Spring. On May 14, 1980, at 1510 EST a Cherokee *Arrow* with two persons on board went out of control while descending through clouds on an attempt to land at Milledgeville Municipal Airport, near Atlanta. The aircraft struck the ground in a nose-down attitude two miles from the airport and was demolished. The pilot was killed; his passenger survived, with head and neck injuries.

The pilot, 45, an attorney, held a commercial certificate but was not instrument-rated. His passenger, a business associate, stated that the pilot had always described himself as "strictly a fair weather flyer," who took pains to avoid becoming involved in any kind of weather problem.

ATC records show that prior to takeoff the pilot had appeared in person at the Savannah FSS at 1315 and asked for all weather data pertinent to his intended route, which was to follow V–154 to the Dublin VOR, and then fly on the Dublin 330 radial to Milledgeville. The distance was approximately 200 nautical miles, estimated time of arrival 1530 EST. The specialist indicated VFR weather was forecast for most of the state until 1800 EST, at which time a low pressure system was expected to begin moving in from the Appalachians.

A weather observation taken at Milledgeville gave the 1300 GMT weather as: 2,000 scattered, estimated 6,000 broken, visibility 8 miles, temperature 75, winds calm, altimeter 29.92". This was provided to the pilot at his briefing.

The pilot opened his flight plan at 1335 EST, stating that the *Arrow* was off the ground at 1330. The flight service station also received a radio call from this aircraft at 1400 EST requesting any SIGMET, AIRMET or PIREP for his route and destination. There were no SIGMETs or AIRMETs, and the only available pilot report indicated the weather as far as Atlanta was as forecast.

At 1445 EST the FAA Flight Watch received a radio call from the same pilot, who reported he was over the Dublin VOR at 4,500' and bound for Milledgeville. He stated that VFR conditions were holding up over his flight path. He asked for and was given his en route weather and the latest weather report for Milledgeville which was dated 1400 GMT. The pilot commented that it was exactly the same as the previous report, thanked the specialist and said he expected to be on the field in about 15 minutes. This was the last contact between the pilot and ATC.

The passenger, who survived, stated in a later interview that he had observed the sky becoming generally overcast as they approached their destination. The pilot told him they were flying well under the reported ceiling, and that there were only a few scattered clouds reported over the airport, which would be no problem. Both men caught a momentary glimpse of the town of Milledgeville but then their reference to the ground was blocked out by a cloud. The pilot said something to the effect that he was going to "... slip down through the next opening and then they would be in the clear ... *their 2:00 p.m. report said scattered clouds, and eight miles visibility, and that has to be VFR.*" The passenger fastened his seatbelt, as the weather was starting to get bumpy during their descent. Then he was aware that they were spinning in the clouds, and shortly afterwards there was a violent impact and he lost consciousness.

Somehow the unfortunate pilot of this aircraft overlooked the significance of those three letters—GMT—or forgot that weather is always given in Greenwich Mean Time. Probably he assumed that all observed weather reports are made hourly throughout the day, which is generally but not always the case. Somehow, also, he managed to persuade himself that the cloud layer he was attempting to penetrate in order to land consisted only of scattered clouds when in fact it had become a fairly dense ceiling with very few breaks in it. Faith in the accuracy of weather briefings as provided by the Weather Service or presented by flight service stations is well merited, as any experienced user of the system can testify, but no information received from another source should ever allow a pilot to disregard what he can plainly see from his cockpit—where the final decisions have to be made.

When weather briefings are provided by FSS specialist they are a summarization, in plain English, of Weather Service forecasts, PIREPs, satellite data, and ground station observations. The specialist selects from a mass of available data that information which appears pertinent to each individual pilot's flight—insofar as the pilot has disclosed his intentions, type of equipment, ratings, etc.

Although the FSS weather briefer necessarily condenses flight data, in order to enable the pilot to absorb what he needs, additional information will be supplied on request. For example, the pilot may ask for previous observations at an airport, in order to help him determine whether conditions are improving, worsening, or remaining stationary.

Most pilots realize that a *forecast* is a *prediction* of what the weather is generally expected to be, usually over a broad area and over a time frame encompassing as much as 18 hours. It stands to reason that conditions will not be uniform over the entire area or for the entire time period. Most pilots also realize that a weather *report*, in contrast, is an observation of certain actual conditions measured at a given moment—usually once an hour—at a given point on the surface of the earth (PIREPs, or pilot reports, are also important observations, made at a given point in the airspace). *However, the continuing prevalence of weather as a factor in takeoff and landing accidents suggests that some pilots do not fully understand how an observation is made.*

Vertically the ground observer can see only what is visible within his observing area. Note that the observer will see and record only the *base* of the ceiling or cloud; he is not in a position to estimate cloud tops. If there is a fairly heavy layer of scattered clouds, this may affect his ability to measure the height of any ceiling made up of higher clouds.

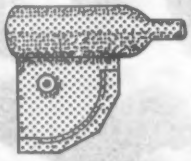
Laterally the observer's view is limited to his perceived horizon, which may be very broad, if he is located on flatland away from buildings, or very restricted if he is surrounded by mountains or other natural objects. It is possible for an airport situated in a narrow valley to have absolutely clear skies while just over the nearest ridge a thunderstorm is forming. Knowledge of the terrain is important to the pilot's understanding of his weather briefing.

Since clouds are always moving, a cloud layer the observer decides is "scattered" could escalate to "broken" minutes after an observation is made—or vice versa. The time tag on a weather observation is always of critical importance, especially as concerns destination weather. On a cross country flight it is important for the pilot to have a *recent* destination airport report. Failing to account properly for the time zones can invalidate all of the weather information a pilot absorbs to safeguard his flight.

Ceiling or cloud height (in feet above ground level) appears first in every official observation report. Cloud heights are sometimes *estimated* by timing the ascent of a helium-filled balloon from its release on the ground to its disappearance into the clouds. In still air, the ascent rate of the spherical 10- or 30-gram balloon is approximately 500–700 feet per minute respectively.

Cloud Height Measurements

CLINOMETER



CEILING LIGHT PROJECTOR

At night balloons can be used to estimate the cloud height also, but they are difficult to keep track of without light. Nighttime cloud heights are sometimes measured with a ceiling light and clinometer. The light is a projector with an incandescent 500-watt lamp (similar to a search light) which projects a beam from the surface to the base of the clouds. The clinometer looks much like a sextant with a free-moving pendant.

The observer stands a fixed distance (called a baseline) away from and as close as possible to the same level as the projector. He sights through an eyepiece on the clinometer until the crosshairs are aligned with the brightest portion of the light reflected on the cloud base. The pendant is tightened down, and the angle to the cloud base is read from an attached gauge. This angle, along with the length of the baseline, enables the observer to calculate the height of the clouds.

This method of measurement can be used for clouds up to 15,000 feet with an error factor of 20% or less, provided the resulting cloud height is not more than 10 times the length of the baseline used. If this happens, a ceiling would be reported as *estimated* rather than measured. (Note: When no ceiling is present, cloud heights are not prefixed by "measured" or "estimated," and there is no way of knowing how they were determined.) It is also important for accuracy that the observer and projector be no more than 900 feet apart (the limit of the focusing ability of the clinometer) and as close to the same level as possible, in order to form a right triangle.

Although fairly accurate for nighttime measurements, the light/clinometer combination cannot be used in daytime except on overcast days, and then the "measurement" must be reported as estimated.

A device called a ceilometer is now coming into wide use for accurate day and night measurements. Using a cathode ray, a high-intensity beam of light, the ceilometer scans the sky and by measuring the time it takes for the light to be bounced back, prints out a graph showing not only the cloud height but also the extent of the sky that is covered by clouds. This is by far the most accurate means of judging cloud heights, day or night, with less than a 10% error range.

With experience, the observer can learn to estimate cloud height to within a few hundred feet of exact height with the naked eye, using instrumentation or a chart to check his guess. Veteran pilots, too, acquire this cloud-eyeing ability, checking it with weather service observations. But naked eye estimating becomes unreliable above 10,000 feet. This is about the limit of the human eye to distinguish depth without other visual cues.

In determining the sky cover, the observer lives up to his title—he *looks* at the sky and uses his best judgment. A ceiling is aeronautically defined as the lowest *broken*, overcast, or obscured layer of clouds or other obscuration. The observer mentally divides the dome of visible sky in his area into tenths and notes the amount of cover for each tenth, adding to get a total sky cover. Less than one-tenth cover is considered *clear* (CLR). One-tenth to one-half cover is called *scattered* (SCT); six- to nine-tenths is *broken* cover (BKN); and all of the sky covered is called an *overcast* (OVC). With experience, the certificated observer is usually accurate to within one-tenth of the whole.

Sky cover that is translucent is described as *thin* (e.g., thin scattered is indicated as −SCT); cover that hides the sky is *opaque*. To be considered a ceiling, the broken or overcast layer must be more than half opaque (e.g., "thin broken" clouds do not form a ceiling).

The observer judges the thinness or opacity of the sky cover by what he can see through it. In daylight, a pale sun or dimly visible higher clouds indicate that the lowest layer is thin. Fuzzy stars or moon halo at night similarly mean a thin cover. An opaque cover completely obscures the sun, blue sky, or higher clouds from view in the day and produces a very dark, starless night.

Ground-based cover, such as fog, can also be a ceiling and is referred to as an indefinite ceiling (W), when it obscures the entire sky. If as little as one-tenth of the cover is translucent, then the cover is called "partially obscured" and it cannot be a ceiling.

Ground observers and pilots will often see clouds from a very different viewpoint. To the observer, overlapping cloud layers at different heights may appear as a solid cover, and be reported as "overcast." Pilots flying between the layers may have the ground in sight most of the time and wonder about the overcast ceiling mentioned in the preflight briefing. Also, a pilot approaching an area from an angle relatively low to the horizon may see a scattered cover as a continuous mass—and wonder where the reported VFR conditions went. Pilot reports to ground stations are the only means those stations have of determining actual conditions in flight at altitude.

Visibility is the next element in the surface observation. Clear skies do not necessarily mean unlimited visibility, and a pilot who jumps to this conclusion could find himself in a cloudless sky with IFR conditions; a stationary front often brings days of clear skies but ever-decreasing visibility from trapped smog and haze.

To measure visibility, the observer selects objects, called visibility markers, a known distance away from the observing point—up to a mile from

the runway threshold. Distances to the markers can be determined precisely by a surveyor for a nominal fee, or estimated from sectional charts or geological survey maps.

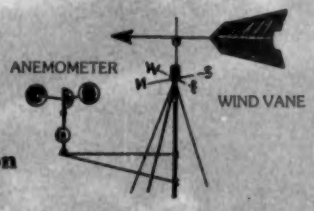
For official observations, markers (number unlimited) are selected for a roughly circular area around the airport. Once their distances are known, the observer plots their positions on a circular grid marked off in concentric circles that represent statute miles. The observer divides his area into sectors containing several markers each. The most distant marker that can be seen in each sector is noted. The prevailing visibility is defined as the greatest distance that can be seen through 180° or more of the observing area. For example, in a four-sector area, assume visibility values of 5, 6, 8 and 4 miles are observed. The prevailing visibility, then, is six miles because there is at least six miles visibility in two of the four sectors.

Visibility at an observing site may be reduced by local phenomena such as patchy fog, smoke, or smog. A pilot flying toward the area with excellent en route visibility may be tempted to disregard reports of lowered visibility at his destination.

The relationship of temperature and dewpoint is an example of how each element of the weather report is related to other elements. For example, clear skies and good visibility are reassuring but if the temperature and dewpoint are closing on each other, changes in the weather should be anticipated. When these readings are within four degrees of each other, the air is cool enough for moisture to condense, creating fog or low clouds. By noting successive observations over a period of time a pilot can see whether a forecast for his area of flight appears to be developing on schedule.

For measuring temperature and dewpoint; ordinary mercury thermometers approximately a foot long are used. The bulb of one is covered by a muslin wick, which is saturated with water and then cooled by twirling the thermometer through the air or aerating it with an electric fan. The resulting drop in temperature is the dewpoint.

Weather observer thermometers are accurate to within one degree. The major cause of inaccurate readings is rarely the instrument itself but exposure to direct sunlight or other sources of heat. To prevent this, the observer stores his thermometers, which must be outside, in an instrument shelter with louvered sides that permit ventilation but keep out rain or snow. The shelter is placed over grass or soil, which does not reflect as much heat as concrete or asphalt, and is located as close as possible to a runway. The access door of the shelter faces north, to prevent an inaccurate reading from exposure to direct rays of the sun.



Windspeed and Direction

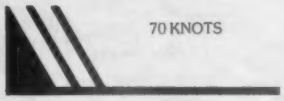
Wind direction and speed are the next elements in the surface observations and also relate to others.

The three-cup rotating anemometer with an attached wind vane is a familiar sight at airports as well as on the roofs of farm houses. Speed and direction are read from indoor gauges electrically connected to the anemometer. Proper maintenance and positioning of the device is important to its accuracy.

If there is no wind equipment or it is not functioning, direction and speed can be estimated with reasonable accuracy in a number of ways.

Wind speeds up to about 15 knots can be estimated roughly from a wind sock (fully extended at 15 knots). The character of the wind, either steady, gusty, or squally, can also be determined by watching the movement of the sock.

An approximation of wind direction can be made by noting the direction of drifting smoke or by comparing the position of wind tee, tetrahedron, or sock with the known directional alignment of the runway and adjusting for the fact that the runway is aligned with magnetic north and the wind is officially reported according to true north.



Beaufort Symbols

Wind speed can also be estimated using the Beaufort Scale, originally derived from nautical use in 1805 by British Admiral Sir Francis Beaufort. The scale has since been modified for land use. Approximate wind speeds are determined by comparing the observed character of the wind and the effect it has on natural objects. For example, a wind that keeps leaves and small twigs in constant motion is described as a "gentle" breeze, and its speed is seven to 10 knots. However, if either direction or speed is estimated, both are reported as estimated in the weather report.

Cloud movements are never to be used to estimate surface windspeed: speeds aloft are much higher than those on the ground.

Wind speed and direction data, together with temperature and altimeter reading are potential signals of frontal movements. A steady increase in windspeed, as noted over a series of several observations, is one indication that a front is moving toward the area. A gradual decrease in wind speed usually means the front is moving off in a direction opposite to the prevailing wind.

Wind direction also give a clue to the presence of high and low pressure systems. In most areas of the U.S., a change from a southwest wind to northeast, accompanied by a rising altimeter means a high pressure system is coming through or a low is moving out.

A current and accurate altimeter setting is of course important to the instrument pilot. But the VFR pilot on a long cross-country must also periodically reset his altimeter. If an emergency landing should become necessary, the accuracy of this instrument can be crucial. For most surface observations the station pressure in millibars is obtained from a mercury or aneroid barometer, then converted to an altimeter setting in inches of mercury.

To assure accuracy the barometers are kept indoors; there is not enough difference between indoor and outdoor air pressure to affect an accurate reading. The instruments must be vertical in a stable location free of vibration, and at observer eye level to prevent parallax error when observing. Since extremes of heat and cold affect the delicate internal parts of these sensitive instruments, they should be located well away from heaters or air conditioning units. The barometers are periodically calibrated according to a standard barometer kept by the Bureau of Standards. Daily station accuracy is assured by a practice of taking 10 barometer readings, each several minutes apart, and determining the mean difference for the readings.

If the mean difference translates to as little as 10 feet of altitude, the altimeter setting cannot be reported. Of course, this means no instrument approach can be made at that airport unless a nearby altimeter setting can be obtained. Even VFR approaches might be reconsidered if conditions are marginal and no altimeter setting is available.

The "army" of weather observers and forecasters in the United States are one important reason why flying is as safe in this country as it is humanly possible to make it. The fact remains that a briefing is not always a clear indication of whether any individual pilot should carry out a flight or not, or how safe it will be. By understanding or visualizing the source of weather information, and by steadily adding to his own stock of weather lore, a diligent pilot can learn to derive a much broader and more detailed picture of the conditions into which he is proposing to fly.

It still isn't all done with computers. ■

De-icing versus Anti-icing on the Ground

On February 12, 1979, a Nord 262 commuter twin turbo-prop crashed while taking off from Clarksburg, WV during a light snow shower, killing two persons and injuring seven. Investigators for the National Transportation Safety Board concluded that the probable cause was an accumulation of frozen snow and ice on the wing and tail surfaces, causing loss of lift and directional control—despite the fact that the aircraft had been sprayed with a de-icing solution approximately one-half hour before departure.

On February 18, 1980, a Bristol *Brittania* 253, a four-engine turboprop on an air cargo flight, crashed under somewhat similar circumstances after leaving Boston's Logan Airport. Seven persons died and one person was severely injured in the ensuing crash and fire. Again, the airplane had been thoroughly sprayed with a de-icing agent approximately 45 to 60 minutes before taking off in a light snowstorm.

What are de-icing, or anti-icing, solutions, and how effective are they for aircraft protection?

The de-icing solution is commonly a mixture of alcohol and glycerine plus anti-corrosive additives, known as ethylene glycol. Chemically it is very similar to (but not interchangeable with) automotive anti-freeze. As a de-icing agent it is usually diluted with water in accordance with prevailing temperatures.

The solution is applied by broom or brush, or, when the equipment is available, by a spray which may also heat the liquid. Ice is soluble, to some degree, in the solution at ambient temperatures. Ice or frozen snow may also be melted by the heat, or dislodged by the physical pressure of the application. Plain water, if heated or applied under pressure, would have the same effect, and is in fact used by some operators when the ground temperature stands at 32° or above. Various ratios of ethylene glycol and water are recommended for de-icing in accordance with temperature and other weather variables.

The solubility of ice in ethylene glycol also means that in the process of removing ice and slush, dilution with water takes place, and sooner or later the freezing point of the resulting fluid could rise above the ambient temperature. This might have a serious adverse effect—i.e., promote a new accumulation of ice or freezing snow on the aircraft.

TAKEOFF ACCIDENTS—ICING 1978-1979

(ice, snow, or frost on wings or tail)

Accidents

Total: 26 Fatal: 5

Fatalities: 14

Aircraft Destroyed: 7
Aircraft Substantially Damaged: 19

In the accident at Clarksburg cited above, a de-icing solution consisting of ethylene glycol and water had been applied, unheated, approximately one half hour before leaving the gate. Investigators theorized that a snow shower, which occurred after the de-icing application but prior to departure, diluted the de-icing fluid to the extent that fresh snow began to collect and freeze on the surfaces. According to the station agent, the *Nord* had about one-quarter inch of snow on all of its horizontal surfaces when it left the ramp. Before taxiing the captain declined an offer to repeat the de-icing procedure, apparently on the assumption that any new snow would blow off as the airplane moved toward the runway. Some, but not all, of the snow was seen to blow free after startup or during taxiing.

Shortly after takeoff the right wingtip contacted the runway and the aircraft flipped over and crashed. The National Transportation Safety Board concluded that aileron effectiveness had been lost due to the configuration of snow adhering to the wingtips.

In the second accident, at Logan Airport in Boston, the Safety Board also theorized that the use of a 30/70% solution of ethylene glycol and water as a de-icing agent may have enhanced

De-icing high wing requires visual inspection from a ladder, as well as a long arm.

Wing covers can save the pilot considerable labor. Anti-icing may be advisible if snow or freezing rain occurs before takeoff.

Pressurized anti-icing with huge cranes also saves labor, but may not be available to general aviation.

the accumulation of wet snow to the extent that airfoil distortion led to loss of control after takeoff.

At most general aviation airports the pressurized spray equipment used for de-icing air carriers on the ground is either not available or beyond the economic reach of private pilots. When such a treatment is affordable, the pilot of a small aircraft should make certain that the liquid has not been pressurized into areas where it does not belong—such as avionics compartments in the nose cone, for example. Commercially de-iced aircraft have taken off *sans* one or more radios.

For small aircraft, removal of structural icing on the ground normally begins with handbrushing to clear away any snow or ice that is not solidly adhering to the surface. For patches of solid ice, the time-honored (and still very effective) method is to pull a hemp rope back and forth over the surface. **Pounding, chiseling or chipping, or the use of any hard-edge tools, is very likely to cause serious damage to the aircraft.** Hot air blowers are sometimes helpful, but it is probably better to restrict their use to small areas, so that the runoff can be wiped away rather than allowed to pool and refreeze *unseen*, perhaps over drainage holes or around hinges. This problem may also occur when snow falls on an aircraft that has just been wheeled out of a warm hangar.

The same ethylene glycol solution used for de-icing is also used for ground *anti-icing*, except that in the latter use it is usually applied full strength. The liquid is sprayed or hand-brushed over the aircraft surfaces for the purpose of preventing ice accumulation between flights.

Anti-icing must be done on a clean, dry airplane, best accomplished by placing the aircraft in a heated hangar. An application of 100% ethylene glycol may prevent a hangared aircraft from acquiring a glaze of frost upon exposure to outside air.

The degree of protection afforded by this procedure varies greatly. Manufacturers have not provided any field test evidence concerning the effectiveness of ethylene glycol in aviation. Given the streamlined shape of aircraft structures, much of the anti-icing agent simply runs off onto the ground.

What remains is not actually a coating, in the sense of having measurable depth, but is more like a thin film of temporary duration. It might prevent frost formation on aircraft left outside overnight, but then again it might not. To a certain extent, and for a certain period, it could prevent icing or snow adherence, but this would depend on the temperature and type of precipitation. Aircraft which were thoroughly anti-iced before leaving the ramp have been known to return for snow/ice removal after experiencing lengthy air traffic delays before they could take off. *The fact that a de-icing or anti-icing treatment has been applied to an aircraft is never any guarantee that it is ready to fly when you are.* You have to get out of that nice warm cockpit and take a good look before you go. It is uncomfortable in subfreezing weather, but so is walking back from an unsuccessful takeoff.

There are many hangar stories about pilots taking off in airplanes with great gobs of ice on the wing, and some of these stories may even be true, but the chances are these airplanes were fairly early models with more forgiving aerodynamic qualities. The laminated flow design of modern airplane wings (symmetrical chord shape) is much more sensitive to any slight distortion of airflow. In one recent near-accident the pilot had removed all of the ice on his airplane before taking off except for one small spot the size of a half-dollar, which had stubbornly remained in place—apparently located at the head of a long bolt. He became airborne all right but as he approached cruising speed he felt a violent buffeting from the wing, which could be relieved by reducing power considerably. He was obliged to land at the nearest airport—with the spot of ice still in evidence.

If de-icing or anti-icing fluid is applied by the pilot, it should be done in strict conformance with the recommendations of the manufacturer of the aircraft, as well as the de-icer. Some agents may be injurious to certain airframe components, such as windshields, when applied at full strength. If the materials are applied by an airport service company, the pilot will want to know the kind of agent used, the ratio of water added, if any, and the exact time of application—unless he personally observes it, which many pilots prefer to do.

> Warning: Do not use the type of ethylene glycol prepared for automotive antifreeze on an aircraft. It contains additives which can injure the airframe. Aviation de-icing fluid is carefully formulated to suit aviation components and conditions of use.

In any event, the pilot-in-command—not the de-icer manufacturer or service man—is responsible for ascertaining that the airframe is free of any frozen precipitation at the time of takeoff. The assumption that propblast or takeoff speed will blow the surfaces clean has led to some tragic and costly takeoff accidents in winter. Likewise a naive belief in the magical powers that come out of a drum of chemicals. Use whatever helps you fly the aircraft safely, but understand that there are conditions, occasionally, when it is humanly impossible to get an aircraft into a departure position and know that it is free of ice or adhering snow.

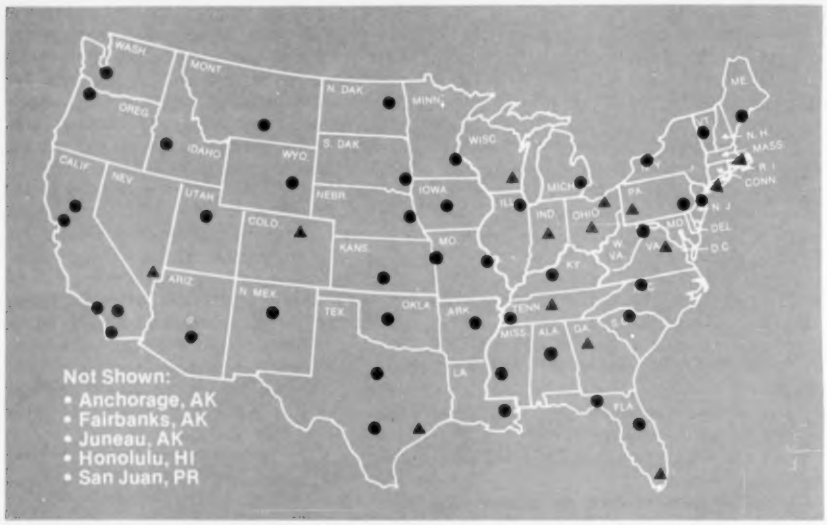
The best pilots know when not to go. ■

For additional information on this subject, AC 91-51, Airplane Deice and Anti-ice Systems, is available from DOT/FAA Publications Unit, M-443.1, Washington, DC 20590.

Iced-up antenna case can distort radio signals.

Snow patches on the tail may be overlooked.

Chipping at stubborn ice can damage airframe.



TRIANGLES SHOW LOCATIONS SELECTED FOR THE FIRST 14 MODERNIZED FLIGHT SERVICE STATIONS, EXPECTED TO BE OPERATING BY 1985: Denver, CO; Miami, FL; Atlanta, GA; Indianapolis, IN; Bedford, MA; Las Vegas, NV; Islip, NY; Cleveland, OH; Columbus, OH; Pittsburgh, PA; Nashville, TN; Houston, TX; Manasssas, VA; Milwaukee.

BLACK DOTS ARE TENTATIVE SITES FOR THE REMAINING 47, SCHEDULED TO BE COMPLETED BY 1989: Anchorage, AK; Fairbanks, AK; Juneau, AK; Birmingham, AL; Little Rock, AR; Mesa, AZ; Concord, CA; Long Beach, CA; Riverside, CA; Sacramento, CA; San Diego, CA; Orlando, FL; Tallahassee, FL; Honolulu, HI; Boise, ID; Chicago, IL; Des Moines, IA; Wichita, KS; Louisville, KY; New Orleans, LA; Augusta, ME; Pontiac, MI; Minneapolis, MN; Jackson, MS; St. Louis, MO; Kansas City, MO; Billings, MT; Greensboro, NC; Grand Forks, ND; Omaha, NB; Teterboro, NJ; Albuquerque, NM; Buffalo, NY; Oklahoma City, OK; Portland, OR; Philadelphia, PA; San Juan, PR; Greenville, SC; Sioux Falls, SD; Memphis, TN; Fort Worth, TX; San Antonio, TX; Salt Lake City, UT; Burlington, VT; Seattle, WA; Charlestown, WV; Casper, WY.

Annual Review Training Program Endorsed Widely

Review instruction as an annual exercise is catching on rapidly all over the country, since formulation of the FAA pilot proficiency program in July of 1979. Over 10,000 pilots have completed at least one course in the program, which is designed to assure retention of basic flying skills among general aviation pilots.

Proficiency training differs from the Biennial Flight Review in that the BFR is mandatory but may or may not involve instruction. The proficiency program, which is voluntary, calls for three hours of dual instruction in an FAA-approved course in basic flight maneuvers and use of instruments.

Reviews of accidents in general aviation, which are more numerous than accidents in the other segments of flying which require recurrent training, indicate that experience alone does not necessarily prevent the development of unsafe flying habits.

Pilot response to the program has been most evident in the New Orleans area, where nearly one out of every seven pilots has participated. New Orleans is a key base of helicopter operations to offshore oil rigs which require lengthy overwater flights daily in all kinds of weather. Over 500 pilots who fly for Petroleum Helicopters, largest operator of this kind in the world, are in the program. Their accident rate is approximately one accident for every 35,000 hours of operation, which is five times better than the national helicopter accident rate of one accident for every 6,983 hours of use.

Details for enrolling in a pilot proficiency program are available from FAA Flight Standards field offices and from many fixed base operators. Effectiveness of the training has attracted many foreign pilots—including some from the Far East—to visit the United States in order to sharpen their flying skills.

IFR Landing Rule Change

Under a rule change effective May 8, 1981, the provisions of FAR Part 91.117, "Limitations of Use of Instrument Approach Procedures," have been incorporated into an expanded Part 91.116, "Takeoff and Landing Under IFR."

The rule now states that an instrument approach may not be continued beyond the minimum descent altitude or decision height unless the *flight* visibility is at least that prescribed in the approach chart, regardless of the visibility being reported on the ground. Also, the runway itself must be "distinctly visible and identifiable" to the pilot at the MDA or DH—not merely some nearby landmarks. Pilots must see one of the following: runway markings or lights, the threshold, threshold markings or lights, touchdown zone markings or lights, or a visual approach slope indicator.

Full details of the rule changes were published in the January 8, 1981 *Federal Register*, Vol. 46, No. 5, which can be purchased for $1.00 from Superintendent of Documents, Government Printing Office, Washington, DC, 20402.

FSS Relocation Plan Revised

Site selection for future modernized flight service stations, which will eventually replace existing stations, has been completed, with an emphasis on locations at general aviation airports. Earlier plans to co-locate FSSs with Centers or situate them at other off-airport sites have been discarded.

Modernization would replace the 318 existing flight service stations with 61 highly computerized stations. These will be able to service pilots at a much faster rate and enable FAA to keep pace with the projected increased demand for such services without incurring unmanageable expenditures for added personnel.

Latest Airmen Publications

Ground Instructors

Primary ground instructors will be interested in the updated Advisory Circular, "Advanced Ground Instructor Written Test Guide," AC 143–4 may be purchased from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402 for $4.00.

Gliders

Advisory Circular 61–81A, "Glider Written Test Guide," for private and commercial glider ratings has been reissued: fee, $1.60. Also available is an updated advisory circular for prospective glider instructors AC 61–75A, "Flight Instructor Glider Written Test Guide," costing $2.00. Both written guides can also be purchased from the Superintendent of Documents.

ELTs

Everything you ever needed to know about emergency locator transmitters and did not know where to find is included in AC 91–44A, "Operational and Maintenance Practices for Emergency Locator Transmitters and Receivers." This advisory circular combines updated information previously published in five separate circulars into a single one. Free from DOT Publications, M–443.1, Washington, DC 20590.

Preflight Preparation

All phases of preflight preparation are examined in updated Advisory Circular 61–84A, "Role of Preflight Preparation." The circular suggests how to avoid accidents by compiling preflight information from a variety of sources and recognize possible hazards to takeoff associated with weight and balance, the presence of ice or frost, density altitude, wind, and runway conditions. AC 61–84A is also free.

Airplane Theft on the Rise

Aircraft thefts rose 49% in 1980, due chiefly to the activity of drug smugglers. Medium twins with high useful loads are the favorite target of thieves and most are never recovered.

Victims of airplane theft should immediately notify police and the nearest flight service station so that an FAA stolen aircraft alert can be issued. Advisory Circular 150/5200–6A, "Security of Aircraft at Airports," (available free from DOT Publications Section, M–443.1, Washington, DC, 20590) has suggestions for protecting aircraft from thieves.

• Balloon Frequencies

What would the proper frequency for air-to-ground communications for either a sailplane or a balloon and a ground crew?

John J. O'Connell
Deerfield Beach, FL

If the balloon or sailplane is launched from an airport with an FAA control tower, then the assigned ATC frequency would be used for communication with a ground crew. Communications at uncontrolled airports are not required, but pilots of these aircraft entering or departing the traffic pattern should broadcast on the airport's UNICOM frequency. If the aircraft are equipped with two-way radio, conversations between pilots and ground crews can be made on 123.3 MHz or 123.5 MHz. However, many use citizens band radio or other informal sources for air-to-ground communication.

• Low-Time Observers

In the article "Weather Watchers" in the November/December 1980 issue, you mention that weather observers are "trained and certificated in one week." That seems like a short time to train a competent observer.

Joe Waldrop
Dalhart, TX

It is. The classroom training and testing take only one week, but, as we neglected to mention, observers receive several weeks of additional on-the-job training at their respective facilities before they are qualified. They are not permitted to take observations on their own until their skills satisfy a supervisor who is an experienced observer.

• Who Shot Mt. St. Helens?

I thought the article on maintenance considerations of Mt. St. Helens ash fallout (September/October 1980) was very interesting and useful, especially for those of us from the area. The before and after photos were fantastic, and I was wondering what photographer should get the credit.

Ginny Harold
Boise, Idaho

Mr. Charles Berry, a specialist at the Seattle Flight Service Station, was the photographer.

• Keeping in Touch

The last line in the article "Dead Air" (July/August 1980 "Briefs") says, in part, that ". . . most FAA ground facilities have more than one frequency, and they always guard 121.5."

I can assure you that there are many ATC facilities large and small that no longer have 121.5. I also know that in some facilities that still have the 121.5 equipment, the frequency is not monitored.

Pilots would be best served to change to their last assigned ATC frequency and advise the controller when they encounter a frequency blockage. This will get far more satisfactory results than changing to 121.5.

Kelly Chaplin
Bedford, TX

All of FAA's 318 flight service stations guard 121.5 and most of the approximately 500 control towers in the country do so as well, except when co-located near an FSS or Air Route Traffic Control Center. It is true that most of the 21 Centers no longer have this capability, but the FSS/tower network will normally be responsive within the listening range of the Centers.

The method you suggest for re-establishing contact with ATC would be a satisfactory alternative.

• Fixed-Wing Cross-Country

I am presently instructing three commercial, instrument rated helicopter pilots for add-on fixed-wing commercial-instrument ratings. Each of these pilots has in excess of 1,200 helicopter hours, of which 300 plus are cross-country. Can this helicopter time count toward the required time for fixed-wing cross-country for the instrument rating?

Barbara Harper
Tucson, AZ

Negative. FAR 61.65(e)(1) states that an applicant for an instrument rating must have 50 hours of cross-country time "in the category of aircraft for which the instrument rating is sought." However, the applicant's rotorcraft time may count toward the 200 hours of flight time and 100 hours of pilot-in-command time required for the instrument rating.

• Bypassed Pilots

I would like information on how a pilot who has had bypass surgery can return to flying. Does FAA recognize modern day surgical techniques in this area?

Harold Lossner
Des Moines, IA

Indeed it does. In order for a pilot who has coronary bypass surgery (where a blocked or damaged cardiac blood vessel is replaced with a healthy vessel from another part of the body) to resume flying, he must apply for an exemption from aeromedical regulations.

No sooner than one year after his surgery, the pilot's cardiologist must send the results of a cardiovascular evaluation with treadmill stress test and a post-operative angiogram to the Federal Air Surgeon's office. If the stress test results are satisfactory and if the angiogram shows the bypasses are still functioning and there is no new or unbypassed heart disease, the pilot can receive a Class III medical and resume flying as a private pilot. Mandatory semiannual reevaluations (stress tests) are also required indefinitely.

• Beech 65–80 Breakers

The "Briefs" section in the September/October 1980 issue contained an article regarding the Beech 65–80 floor-mounted circuit breaker problems. It is mentioned that a 1967 Beech Service Bulletin "requires" relocation of floor-mounted circuit breakers in all of those models. Is compliance with a factory service bulletin required by Federal Aviation Regulations?

Frank McCutcheon
San Jose, CA

Compliance with a factory service bulletin is not mandatory unless it is required in an Airworthiness Directive, or unless the airplane is in an FAA-approved Maintenance Program containing factory service bulletin requirements. FAA strongly recommends compliance by all Beech 65–80 owners.

FAA GENERAL AVIATION NEWS welcomes comments from our readers. No anonymous letters will be used, but names will be withheld on request. Address: FAA GENERAL AVIATION NEWS, AFO-807, Washington, D.C. 20591.

• Long Way From Lexington

I think you twisted a little geography in the article "VFR at Night" in the November/December 1980 issue. Franklin Airport is not in Lexington, KY. It is near Franklin, Kentucky, a long way from Lexington.

We in aviation are plagued by inaccurate reporting in the general press. In our own trade press we should be super careful to tell it right.

Stan Nicola
Irvine, KY

Agreed. The airport referred to in "VFR at Night" was Franklin-Wilkins near Lexington, Tennessee, not Kentucky as we indicated. The Kentucky Lexington being more well known than its Tennessee counterpart, the error was overlooked in proofreading.

• IFR and Student PIC Time

FAR 61.51 says a pilot may log PIC time any time he is the sole manipulator of the controls of an aircraft for which he is rated. Suppose IFR conditions prevail when a pilot is taking instrument instruction. Don't the regulations expressly forbid anyone to fly as pilot-in-command under instrument conditions without an instrument rating?

E. Weber, Jr.
Southbury, CT

An instrument student who has a private or better certificate and is rated in the airplane may indeed log as PIC the time he is sole manipulator of the controls regardless of the meteorological conditions. However, if the flight is under actual instrument conditions the student must be accompanied by a pilot, who may be a flight instructor, holding an instrument rating and who is rated in the aircraft.

• Doubling Up Children

With regard to FAR 91.14, can two children share one seat and seatbelt if the weight limitations are not exceeded, or must each person have their own seat and seatbelt. I have received conflicting answers on this and need it clarified. Our plane has four seats, and we have four children.

Linda Joseph
Alexandria, LA

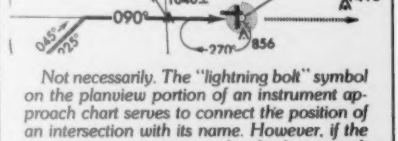
You may need a larger airplane. Any child over two years old must occupy a seat alone and be strapped in for take off and landing. A child under two may be held by an adult who is seated and belted in for takeoff or landing.

INSTRUMENT CORNER

• Lightning Approaches

I have a question in reference to instrument approach charts. On some charts, there is a "lightning bolt" similar to that used to indicate glide slope intercept altitude in the plan view section. Usually there is an intersection name with the "lightning bolt." Does this show the position of a stepdown fix?

Shawn Knickerbocker
Ft. Bragg, NC



Not necessarily. The "lightning bolt" symbol on the planview portion of an instrument approach chart serves to connect the position of an intersection with its name. However, if the intersection appears on the final approach course, it may be a stepdown fix, which permits a descent to be made after overflying an obstacle.

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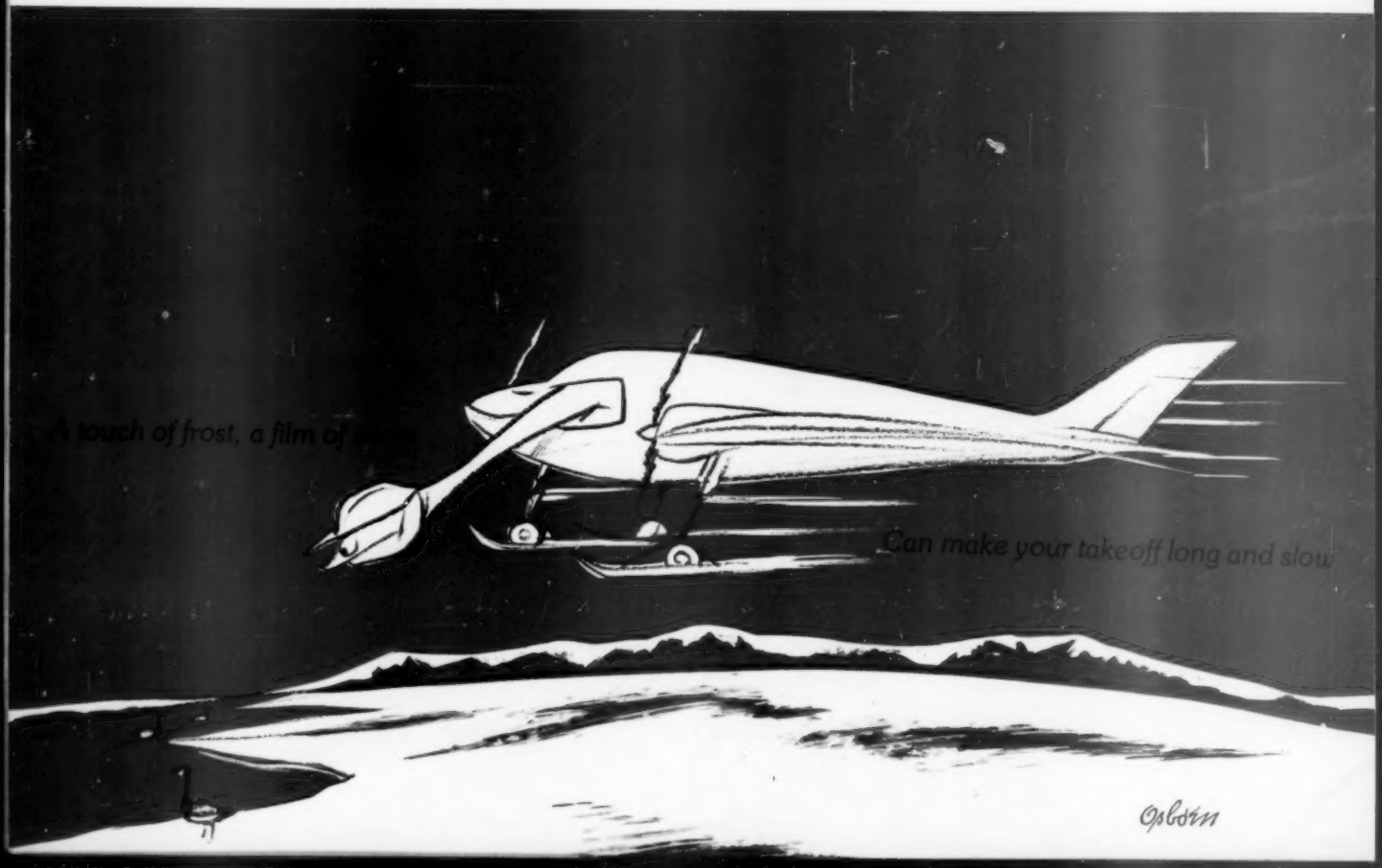
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